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EXAMINER	
GRAYBILL, DAVID E	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/674,853	BARMAK ET AL.	
	Examiner	Art Unit	
	David E. Graybill	2894	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19,38,41,43,44,47,52,53 and 61* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19,38,41,43,44,47,52,53 and 61* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 38 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The following appears to be incorrect and is unclear:

Re claim 53: The multilayer structure of claim 44, which is a diffusion barrier between two materials that are otherwise capable of combining chemically or between a layer and a surface capable of chemically combining with the layer.

In particular, it appears that the particular claimed "two materials": “(Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La)” cannot be one of either “capable of combining chemically” or “capable of chemically combining with the layer.”

The following is a term of degree which render the claim indefinite:

Re claim 38. atomically thin.

In particular, the relative term of degree is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Similarly, the relative language is subjective, qualitative language setting no limit on the scope of what is invented, and there is no method to measure what meets the claim limitations and what does not meet the claim limitations. See *Halliburton Energy Servs. v. M-I LLC*, 514 F.3d 1244, 85 U.S.P.Q.2d 1654 (Fed. Cir. 2008).

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 41 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The undescribed subject matter is the following:

Re claim 41: the sub-layers consist of alternating sub-layers of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

To further clarify, the preambular language "consists of" is a negative limitation exclusionary proviso which does not have basis in the original disclosure and any negative limitation or exclusionary proviso must have basis in the original disclosure. See Ex parte Grasselli, 231 USPQ 393 (Bd. App. 1983) aff'd mem., 738 F.2d 453 (Fed. Cir. 1984). The mere absence of a positive recitation or drawing illustration is not basis for an exclusion.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

> applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 19, 38, 41, 43, 44, 47, 52, 53 and 61 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Graff (6570325).

At column 1, lines 19-34 and 53-57; column 1, line 60 to column 2, line 36 and 45-48; column 3, lines 13-21 and 53-67; column 4, lines 11-31 and 36-41; column 4, line 56 to column 5, line 38; column 5, line 61 to column 6, line 4; column 6, line 22 to column 8, line 10; column 9, lines 36-50; column 10, line 24 to column 11, line 50; column 11, line 60 to column 12, line 5; column 12, lines 18-53; and column 14, lines 4-15; Graff discloses the following:

Re claim 19: A diffusion "barrier" comprising a plurality "at least two' of stacked sub-layers, each sub-layer having a thickness of about 0.4 to about 4.5 nanometers (nm) "If the barrier layer is made of two barrier layers, the thickness of each barrier layer is usually about one half the thickness of a typical single barrier layer, or about 50 to 200 ANG. There are no limitations on the thickness" where interfaces between the sub-layers inherently inhibit the formation of a crystalline lattice, wherein the plurality of stacked sub-layers are arranged collectively to inhibit diffusion of a chemical species "oxygen" through the diffusion barrier, wherein a successive sub-layer comprises a different material from a material that comprises a preceding sub-layer and the different materials selected to comprise the sub-layers are inherently substantially immiscible and inherently exhibit mutual adhesion, and where the plurality of stacked sub-layers are three or more stacked sub-layers, wherein the stacked sub-layers are of alternating

composition, where a layer of tantalum (Ta) alternates with a layer of one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

Re claim 38: A multilayer diffusion barrier comprised of interfaces and inherently atomically thin "If the barrier layer is made of two barrier layers, the thickness of each barrier layer is usually about one half the thickness of a typical single barrier layer, or about 50 to 200 ANG. There are no limitations on the thickness" films in which surface adhesion of each interface inherently inhibits the formation of a lattice in the films, inhibiting diffusion across the barrier, wherein thickness of each film is in a range of about 0.4 to about 4.5 nm, wherein a successive film comprises a different material from a material that comprises a preceding film, wherein the atomically thin films are at least three in number, wherein the stacked atomically thin films are alternating atomically thin films of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

Re claim 41: A multilayer diffusion barrier structure comprised of three or more sub-layers each having a thickness of about 0.4 to about 4.5 nanometers (nm) and an interface, wherein the interface of each of the sub-layers inherently dominates a lattice formation on the sub-layers, preventing the formation of a lattice and grain boundaries, the multilayer structure being arranged to inhibit diffusion of a chemical species through the structure, wherein a successive sub-layer comprises a different material from a material that comprises a preceding sub-layer, wherein the sub-layers consist of alternating sub-layers of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

Re claim 43: A multilayer diffusion barrier for inhibiting diffusion chemical species there through, comprising a plurality of stacked inherently amorphous layers, the thickness of each of said films being between about 0.4 to about 4.5 nm, which is inherently predetermined to substantially eliminate work hardening, wherein a successive layer of the plurality of stacked layers comprises a different metal from a metal that comprises a preceding layer of the plurality of stacked layers, wherein the plurality of stacked layers are at least three in number, wherein the plurality of stacked layers are alternating layers of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

Re claim 44: A diffusion barrier having a multilayer structure comprised of at least three films forming a bond at an interface between each film, each film having a thickness of about 0.4 to about 4.5 nm, wherein the interface inherently dominates a lattice formation, inherently inhibiting the formation of a lattice and grain boundaries, wherein a successive film comprises a different material from a material that comprises a preceding film, wherein the at least three films are alternating films of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

Re claim 47: The multilayer structure of claim 44, wherein the at least two materials exhibit mutual adhesion and are inherently substantially immiscible.

Re claim 52: The multilayer structure of claim 44, inherently having flexibility and inhibited work hardening.

Re claim 53: The multilayer structure of claim 44, which is a diffusion barrier between two materials inherently that are otherwise capable of combining chemically or between a layer and a surface capable of chemically combining with the layer.

Re claim 61: A diffusion barrier as in claim 19, where the plurality of sub-layers are between three and ten in number.

The following is further clarified:

Re claim 19: the stacked sub-layers are of alternating composition, where a layer of tantalum (Ta) alternates with a layer of one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

Re claim 38: the stacked atomically thin films are alternating atomically thin films of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

Re claim 41: the sub-layers consist of alternating sub-layers of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

Re claim 43: the plurality of stacked layers are at least three in number, wherein the plurality of stacked layers are alternating layers of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

Re claim 44: the at least three films are alternating films of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

In particular, Graff discloses “a barrier layer” and, “it is well settled that the term ‘a’ or ‘an’ ordinarily means ‘one or more’.” Tate Access Floors, Inc., and Tate Access

Floors Leasing, Inc., v. Interface Architectural Resources, Inc., 279 F.3d 1357; 2002 U.S. App. LEXIS 1924; 61 U.S.P.Q.2D (BNA) 1647 ((citing Tate Access Floors, Inc. v. Maxcess Techs., Inc, 222 F.3d 958, 966 n.4, 55 U.S.P.Q.2D (BNA) 1513, 1518 [**32] (citing Elkay Mfg. Co. v. Ebco Mfg. Co., 192 F.3d 973, 977, 52 U.S.P.Q.2D (BNA) 1109, 1112 (Fed. Cir. 1999): "As we have previously explained, it is generally accepted in patent parlance that 'a' or 'an' can mean 'one or more'.")). And, "This court has repeatedly emphasized that an indefinite article 'a' or 'an' in patent parlance carries the meaning of 'one or more' in open-ended claims containing the transitional phrase 'comprising.' Unless the claim is specific as to the number of elements, the article 'a' receives a singular interpretation only in rare circumstances when the patentee evinces a clear intent to so limit the article." (Citations omitted). Scanner Technologies v./COS Vision Systems, 365 F.3d 1299, 1304 (Fed. Cir. 2004).

In addition, Graff discloses that a barrier layer is a layer of a layer of tantalum and a layer of yttrium.

Therefore, Graff discloses three layers, each of which are a layer of tantalum and yttrium, and it is inherent that the three layers are alternating layers.

The following is further clarified:

Re claim 38: inherently atomically thin films "If the barrier layer is made of two barrier layers, the thickness of each barrier layer is usually about one half the thickness of a typical single barrier layer, or about 50 to 200 ANG. There are no limitations on the thickness".

In the instant specification, page 7, line 17 to page 9, line 1, applicant discloses that atomically thin "2-5 atomic layers thick" is "0.4 to 1.5nm."

The following is further clarified:

Re claim 19: the interfaces between the sub-layers inherently inhibit the formation of a crystalline lattice.

Re claim 38: the surface adhesion of each interface inherently inhibits the formation of a lattice in the films.

Re claim 41: the interface of each of the sub-layers inherently dominates a lattice formation on the sub-layers, preventing the formation of a lattice and grain boundaries.

Re claim 43: inherently amorphous layers; inherently predetermined to substantially eliminate work hardening.

Re claim 44: the interface inherently dominates a lattice formation, inherently inhibiting the formation of a lattice and grain boundaries.

Re claim 47: the at least two materials are inherently substantially immiscible.

Re claim 52: The multilayer structure inherently having flexibility and inhibited work hardening.

inherently substantially immiscible.

Re claim 52: inherently having flexibility and inhibited work hardening.

MPEP 2112 [R-3] Requirements of Rejection Based on Inherency; Burden of Proof
V. ONCE A REFERENCE TEACHING PRODUCT APPEARING TO BE SUBSTANTIALLY IDENTICAL IS MADE THE BASIS OF A REJECTION, AND THE EXAMINER PRESENTS EVIDENCE OR REASONING TENDING TO SHOW INHERENCY, THE BURDEN SHIFTS TO THE APPLICANT TO SHOW AN UNOBVIOUS DIFFERENCE
"[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is

similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

MPEP 2112.01 [R-3] Composition, Product, and Apparatus Claims
I. PRODUCT AND APPARATUS CLAIMS — WHEN THE STRUCTURE RECITED IN THE REFERENCE IS SUBSTANTIALLY IDENTICAL TO THAT OF THE CLAIMS, CLAIMED PROPERTIES OR FUNCTIONS ARE PRESUMED TO BE INHERENT
Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Therefore, the prima facie case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product.

MPEP 2113 [R-1] Product-by-Process Claims
ONCE A PRODUCT APPEARING TO BE SUBSTANTIALLY IDENTICAL IS FOUND AND A 35 U.S.C. 102 /103 REJECTION MADE, THE BURDEN SHIFTS TO THE APPLICANT TO SHOW AN UNOBVIOUS DIFFERENCE
"The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product.

MPEP 2114 [R-1] Apparatus and Article Claims — Functional Language
For a discussion of case law which provides guidance in interpreting the functional portion of means-plus-function limitations see MPEP § 2181 - § 2186.
APPARATUS CLAIMS MUST BE STRUCTUR-ALLY DISTINGUISHABLE FROM THE PRIOR ART
>While features of an apparatus may be recited either structurally or functionally, claims<directed to >an< apparatus must be distinguished from the prior art in terms of structure rather than function. >In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971);< In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

In particular, the structure and composition of the invention of Graff appears to have these inherent characteristics because the claimed structure and composition and the structure and composition of Graff are at least substantially identical, and/or are produced by at least substantially identical processes; therefore, a prima facie case of

anticipation has been established, and applicant is required to prove that the structure of Graff does not necessarily or inherently possess the characteristics of the instant claimed structure.

Indeed, in the instant specification, page 5, lines 5-14 and page 9, lines 3-14, applicant discloses that these claimed characteristics are inherent characteristics of the claimed structure and composition:

> Accordingly, a method is provided for the formation of very thin, multilayer diffusion barriers composed of even thinner sub-layers, where the sub-layers are only a few atoms thick. An aspect of this invention when forming these layers is to use the interfaces between each of the sub-layers to inhibit the formation of a crystalline lattice in each sub-layer. A strong bond between each of the sub-layers perturbs the regular crystalline structure of the sub-layer, as long as the sub-layer remains very thin. Since the surface energies dominate the bulk binding energies, the sub-layer remains disordered and in a substantially amorphous state (i.e., essentially free of a regular crystalline structure). The lack of formation of a lattice within each sub-layer results in no grain boundary formation, and hence, no pathways for inter diffusion of metals through the barrier as long as the multilayer remains amorphous.
>
> In FIG. 4, an atomic scale magnification of the layers of FIG.3 is shown. As seen in FIG. 4, the individual layers of FIG. 3 are preferably no more than 2-5 atomic layers thick. Because of the strong binding of the interface 470(a) . . . (n), generally 470, between each of the layers, there is no regular crystal structure in the 2-5 atom thick layer between interfaces 470. This region could be considered to be the `bulk' of each of the layers. The nature of the surface binding energy is such that it dominates the normal tendency for the bulk atoms to form a conventional crystal lattice, in effect, inhibiting the formation of a lattice. Without a regular crystalline lattice, there are no breaks in the lattice that would constitute a grain boundary. Because there are no grain boundaries, the physical effect of work hardening is inhibited, resulting in a diffusion barrier with improved structural flexibility. Therefore, the material of FIG. 4 is a substantially amorphous, multilayer solid material and is highly resistant to the diffusion of a chemical species through the material.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

In the alternative, claims 19, 38, 41, 43, 44, 47, 52, 53 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graff (6570325).

Graff does not appear to explicitly disclose the following:

Re claim 19: the stacked sub-layers are of alternating composition.

Re claim 38: the stacked atomically thin films are alternating films.

Re claim 41: the sub-layers consist of alternating sub-layers.

Re claim 43: the plurality of stacked layers are alternating layers.

Re claim 44: the at least three films are alternating films.

Still, as reasoned from well established legal precedent, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to repeat the barrier layer of a layer of tantalum and a layer of yttrium to inherently provide a plurality of alternating layers of tantalum and yttrium to accomplish an expected additive or redundant function or result because applicant has not disclosed that, in view of the applied prior art, this

limitation is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical. Furthermore, it is well established that mere repetition or duplication to accomplish an expected additive or redundant function or result is prima facie obvious absent a disclosure that the repetition or duplication is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical. See, for example, In re Ockert, 114 USPQ 330 (CCPA 1957); In re Schuelke, 96 USPQ 421 (CCPA 1953); In re Hertrich, 73 USPQ 442 (CCPA 1947); Long Mfg. N.C., Inc. v. Condec Corp., 223 USPQ 1213 (DC ENC 1984); St. Regis Paper Company v. Bemis Company, Inc., 193 USPQ 8 (CA 7 1977); In re Harza 124 USPQ 378 (CCPA 1960); Hofschneider Corp. v. Lane et al., doing business as Lane and Co., 71 USPQ 126 (DC WNY 1946); "The parallel, redundant ignition system is an obvious expedient to ensure detonation . . . 'The use of a "plurality" of detonating devices is merely a duplication of existing elements; the concept of having back-up elements in case of failure is a well-known expedient in the art.'" Weather Engineering Corporation of America et al. v. United States, 204 USPQ 41 (Cl. Ct. 1979).

Also, as reasoned from well established legal precedent, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to arrange the layers of Graff as claimed because applicant has not disclosed that, in view of the applied prior art, the arrangement is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical, and it appears prima facie that the process would possess utility using another arrangement. Moreover, it has been held that limitations directed to

rearrangement of parts are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. In re Japikse 86 USPQ 70 (CCPA 1950); for example, reversal of parts was held to have been obvious. In re Gazda 104 USPQ 400 (CCPA 1955). Moreover, "simple adjustment of spatial orientation" has been held to be obvious. Colt Industries Operating Corp. v. Index Werke, K.G. et al., 217 USPQ 1176 (DC 1982).

Furthermore, it would have been obvious to try alternating the layers of tantalum and yttrium of Graff because this would have been a known option within the technical grasp of a person of ordinary skill in the art that would lead to anticipated success of providing a barrier layer and, "a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense." KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385 (U.S. 2007). See also, Pfizer Inc. v. Apotex Inc., 82 USPQ2d 1852 (Fed. Cir. 2007). Merck & Co., Inc. v. Biocraft Labs., Inc., 874 F.2d 804, 807 (Fed. Cir. 1989). Ex parte Min-Hong Fu, Colleen A. Helbig, Kent J. Evans, Kathleen M. Carmichael, and David M. Skinner, Appeal 2008-0601, 03-31-2008.

Graff do not appear to explicitly disclose the following:

Re claim 41: consist of.

Nevertheless, as reasoned from well established legal precedent, it would have been obvious to omit whatever applicant intends to exclude by the claimed term "consist of" if it is not desired. Ex parte Wu, 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989). In re

Larson, 340 F.2d 965, 144 USPQ 347 (CCPA 1965). In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975). MPEP 2144.04IIA.

In the alternative, claims 19, 38, 41, 43, 44, 47, 52, 53 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graff as applied to claims 19, 38, 41, 43, 44, 47, 52, 53 and 61 supra, and further in combination with Hegde (6136682).

Graff does not appear to explicitly disclose the following:

The following is further clarified:

Re claim 19: the interfaces between the sub-layers inhibit the formation of a crystalline lattice.

Re claim 38: the surface adhesion of each interface inhibits the formation of a lattice in the films.

Re claim 41: the interface of each of the sub-layers dominates a lattice formation on the sub-layers, preventing the formation of a lattice and grain boundaries.

Re claim 43: amorphous layers; predetermined to substantially eliminate work hardening.

Re claim 44: the interface dominates a lattice formation, inhibiting the formation of a lattice and grain boundaries.

Re claim 52: The multilayer structure having flexibility and inhibited work hardening.

Nonetheless, at in the abstract, title and at column 2, line 59 to column 3, line 5; column 3, lines 24-44; column 4, lines 19 and 42-53; column 4, line 63 to column 5, line 13; column 5, lines 26-29 and 44-57; column 6, lines 63-64; and column 8, lines 25-58,

Hegde discloses the interfaces between the sub-layers inhibit the formation of a crystalline lattice; the surface adhesion of each interface inhibits the formation of a lattice in the films; the interface of each of the sub-layers dominates a lattice formation on the sub-layers, preventing the formation of a lattice and grain boundaries; amorphous layers; and the interface dominates a lattice formation, inhibiting the formation of a lattice and grain boundaries. Specifically, Hegde discloses, "the second amorphous barrier layer is typically formed as a crystalline material, but is formed as an amorphous material due to the presence of the first amorphous layer."

Furthermore Hedge disclose the structure inherently having flexibility and inherently inhibited work hardening because, as cited supra, Hegde discloses the structure having no grain boundaries. Further, in the instant specification, page 9, lines 11-13, applicant discloses that the structure having flexibility and inhibited work hardening is an inherent characteristic of the structure having no grain boundaries.

Hegde is also applied to the instant claims in combination with Graff for reasons it was applied in the Office action filed on 10-26-07 except for the specific disclosure of the previously claimed metal nitrides.

In any case, the structure and composition of the invention of the combination of Graff and Hegde appears to have the characteristics supra because the claimed structure and composition and the structure and composition of Graff are at least substantially identical, and/or are produced by at least substantially identical processes; therefore, a prima facie case of anticipation has been established, and applicant is

required to prove that the structure of the combination of Graff and Hegde does not necessarily or inherently possess the characteristics of the instant claimed structure.

Applicant's remarks filed on 8-4-8 have been fully considered but are either moot in view of the new grounds of rejection or are addressed infra.

Applicant argues:

> Claim 41 is unamended and recites the term "consist of," Use of this term is well supported by Applicant's filed application. If one of ordinary skill in the art were to review Figure 4 of Applicant's disclosure, he or she would see layers of uniform composition stacked one on the other.

This argument is respectfully traversed because, at best, Figure 4 provides support only for a positive limitation of alternating layers of no particular material and not for the negative limitation that the sub-layers consist of alternating sub-layers of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La). To further clarify, in Figure 4 there is merely an absence of a positive illustration of whatever applicant intends to exclude with the term "consist of." As explicitly stated in the rejection, "The mere absence of a positive recitation is not basis for an exclusion." Indeed, there is no more support in Figure 4 for these negative limitations than there would be for a negative limitation excluding elements 330 and 335 which are not illustrated in Figure 4 but are illustrated in Figure 3.

Applicant further contends:

> It has also been disclosed, on page 6, lines 15-18, that the diffusion barrier 315 "includes a stack of very thin layers 50, 360, generally of alternating composition" and that this stack may be of "two alternating layers of materials." One of ordinary skill in the art, when viewing Figure 4 in light of this passage, would have a clear understanding that Applicant had full possession for the invention found in claim 41 where "the sub-layers consist of alternating sub-layers of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La)."

This contention is respectfully traversed because the specification does not provide support for this limitation. To further clarify, the cited disclosure does not exclude whatever applicant intends to exclude with the term "consists of" because there is a mere absence of a positive recitation of whatever it is that applicant intends to exclude, and, as explicitly stated in the rejection, the mere absence of a positive recitation is not basis for an exclusion. To continue to afford applicant the benefit of compact prosecution, it is respectfully suggested that, at most, the original disclosure provides support only for a positive limitation of alternating sub-layers of tantalum (Ta) and one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La).

In addition, applicant asserts:

> The term "consist of' need not be explicitly expressed within the application as filed to satisfy the written description requirement.

This assertion is respectfully deemed unpersuasive because it is not necessarily maintained in the Office action that the term "consist of" need be explicitly expressed within the application as filed to satisfy the written description requirement.

Applicant also states:

> MPEP 2163.07 states, inter alia, "mere rephrasing of a passage does not constitute new matter" and "a rewording of a passage where the same meaning remains intact is permissible."

This statement is correct; however, the amendatory language "consists of" is not mere rephrasing of a passage because it is not the same meaning as the original disclosure.

The art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily to show inventions relevant to the examination of the instant invention.

For information on the status of this application applicant should check PAIR: Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alternatively, applicant may contact the File Information Unit at (703) 308-2733. Telephone status inquiries should not be directed to the examiner. See MPEP 1730VIC, MPEP 203.08 and MPEP 102.

Any other telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (571) 272-1930. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.
The fax phone number for group 2800 is (571) 273-8300.

/David E Graybill/
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